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09/784,674	02/15/2001	Karen W. Shannon	10971464-3	3167

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EXAMINER	
NEGIN, RUSSELL SCOTT	
ART UNIT	**PAPER NUMBER**
1631	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	09/784,674	SHANNON ET AL.	
	Examiner	Art Unit	
	Russell S. Negin	1631	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *22 January 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,2,4-25,27-40 and 102-165* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2,4-13,15-24,29-40 and 102-165* is/are rejected.

7)☒ Claim(s) *14,25,27 and 28* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Comments

Applicants' amendments and request for reconsideration in the communication filed on 22 January 2007 are acknowledged and the amendments are entered.

Claims 1, 2, 4-25, 27-40, and 102-165 are pending and examined in this Office action.

Claim Objections

The objection to claim 146 because of informalities, set forth in the previous Office action, is withdrawn due to amendments made by applicant to the claim filed on 22 January 2007.

Claim Rejections - 35 USC § 112

The rejections of claims 2, 11, 39, 40, 102-121, 123, 142-143, 148-156, and 158 under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention are withdrawn in view of the amendments made by applicant to the set of claims filed on 22 January 2007.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-2, 5-25, 27-40, 104, 124, 151, and 160 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 recites the limitation "the hybridizable sequence" in lines 7-8. There is insufficient antecedent basis for this limitation in the claim. Since all the mentioned sequences in the claim are hybridizable, it is not known to which sequence applicant is referring.

Claim 104 recites the limitation "the hybridizable sequence" in line 3. There is insufficient antecedent basis for this limitation in the claim. Since all the mentioned sequences in claims 102 and 104 are hybridizable, it is not known to which sequence applicant is referring.

Claim 124 recites the limitation " the hybridizable sequence " in line 3. There is insufficient antecedent basis for this limitation in the claim. Since all the mentioned sequences in claims 122 and 124 are hybridizable, it is not known to which sequence applicant is referring.

Claim 151 recites the limitation " the hybridizable sequence " in line 3. There is insufficient antecedent basis for this limitation in the claim. Since all the mentioned sequences in claims 148, 150, and 151 are hybridizable, it is not known to which sequence applicant is referring.

Claim 160 recites the limitation " the hybridizable sequence " in line 3. There is insufficient antecedent basis for this limitation in the claim. Since all the mentioned

sequences in claims 157 and 160 are hybridizable, it is not known to which sequence applicant is referring.

Step (e) of claims 1, 102, 122, 148, and 157, respectively, recites "selecting, for a cluster, ..." It is not clear whether the cluster has to be one of the clusters recited in step (d) of these respective claims, or it can be any cluster.

Step (f) of claims 1, 102, 122, 148, and 157, respectively, recites "outputting the results of said selecting ...." There are multiple selecting steps in these claims (i.e. steps (c) and (e)). It is not clear which selecting is referred to in step (f).

Claim Rejections - 35 USC § 101

The rejections of claims 1, 2, 4-25, 27-40, 102-145, and 148-165 under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter, set forth in the previous Office action, are withdrawn due to amendments made by applicant to the set of claims filed on 22 January 2007.

Claim Rejections - 35 USC § 103

The rejections of claims 1-2, 11-12, 16-22, 28-29, 37, 39, 40, 102-104, 106-108, 110-112, 119-121, 122-124, 126-128, 130-132, 139-141, 148-151, and 154-156 under 35 U.S.C. 103(a) as being unpatentable over Southern et al. (Nucleic Acids Research, 1994, volume 22, pages 1368-1373) in view of Southern (Current Opinion in Biotechnology, 1996, volume 7, pages 85-88) set forth in the previous Office action are

withdrawn in view of arguments made by applicant on pages 18-24 of the Remarks of 22 January 2007.

The rejections of claims 1, 11, 13-14, 122, 126, 128, and 148-149 under 35 U.S.C. 103(a) as being unpatentable over Southern et al. (1994) in view of Southern (1996), and further in view of Southern et al. [Genomics, 1992, volume 13, pages 1008-1017] are withdrawn in view of arguments made by applicant on pages 18-24 of the Remarks of 22 January 2007.

The rejections of claims 1, 10, 15, 102, 109, 122, 129, 142, 143-145, 146-148, and 153 under 35 U.S.C. 103(a) as being unpatentable over Southern et al. (1994) in view of Southern (1996) and further in view of Drmanac et al. [Genomics, volume 4, pages 114-128, 1989] are withdrawn in view of arguments made by applicant on pages 18-24 of the Remarks of 22 January 2007.

The rejections of claims 1, 5-7, 23-24, 30-36, 38, 102, 105, 113-118, 122, 125, 133-138, 148, 152, 157-162, 164-165 under 35 U.S.C. 103(a) as being unpatentable over Southern et al. (1994) in view of Southern (1996), and further in view of Petersheim et al. [Biochemistry, 1983, volume 22, pages 256-263] are withdrawn in view of arguments made by applicant on pages 18-24 of the Remarks of 22 January 2007.

The rejections of claims 157 and 163 under 35 U.S.C. 103(a) as being unpatentable over Southern et al. (1994) in view of Southern (1996) in view of Petersheim et al., and further in view of Drmanac et al. are withdrawn in view of arguments made by applicant on pages 18-24 of the Remarks of 22 January 2007.

The rejections of claims 1 and 8-9 under 35 U.S.C. 103(a) as being unpatentable over Southern et al. (1994) in view of Southern (1996), and further in view of McMahon et al. [US Patent 5,310,650] are withdrawn in view of arguments made by applicant on pages 18-24 of the Remarks of 22 January 2007.

The following rejections are newly applied:

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

35 U.S.C. 103 Rejection #1:

Claims 1-2, 10-12, 15-22, 37, 39, 40, 102-104, 106-112, 119-124, 126-132, 139-151, 153-156 are rejected under 35 U.S.C. 103(a) as being unpatentable over Southern

et al. [Nucleic Acids Research, 1994, volume 22, pages 1368-1373] in view of Southern [Current Opinion in Biotechnology, 1996, volume 7, pages 85-88] in view of Drmanac et al. [Genomics, volume 4, pages 114-128, 1989].

Claims 1, 102, 122, and 148 are independent claim methods of selecting a hybridization oligonucleotide to hybridize to a target nucleotide sequence. They involve examining and/or clusters of oligonucleotides in order to predict hybridization efficiencies.

Claims 2, 11, 39, 40, 103-104, 106-108, 110-112, 119-121, 123, 148-151, and 154-156 involve using rankings of clusters based on cluster size.

Claim 12 depends for claim 11 with the extra limitation of claiming any number of members within the clusters.

Claims 16-22 and 130-132 depend from claims 1 and 122 with the extra limitation of claiming the species of oligonucleotide and target molecule (i.e. DNA, RNA, labeled oligonucleotide, or attached to a surface).

Claims 37 and 139-141 depend from claims 1 and 122 with the extra limitation of claiming certain types and properties of clusters.

Claims 124 and 126-128 depend from claim 122 with the extra limitation of claiming specific types of cluster ranking and properties of the clusters.

Claims 10, 15, 109, 129, 142, 143-145, 146-147, and 153 involve mathematical, theoretical and computational transformations which require theoretical considerations and computational equipment.

The article of Southern et al. (1994), states in its abstract, "Arrays of oligonucleotides corresponding to a full set of complements of a known sequence can be made in a single series of base couplings in which each base in the complement is added in turn."

Figure 1 on page 1369 of Southern et al. (1994) illustrates an array of oligonucleotides schematically. (as recited in part of step a in claims 1, 102, 122, and 148)

Figures 3 and 4 of Southern et al. (1994) illustrate the experimental and computational analysis of the results on pages 1371 and 1372, respectively. The parameter in Figure 3c indicating extent of hybridization is the color of each ring with respect to the others (i.e., a darker rung represents greater hybridization intensity). This "rung darkness" represents a parameter of hybridization intensity (as recited in step b of claims 1, 102, 122, and 148). Based on this parameter, several clusters of darker colors are present in Figure 3c. Figure 3c also illustrates (through numbers with arrows) selection and identification of specific oligonucleotides in the subsets that are hybridizable to the target nucleotide sequences (as recited in claims 123 and steps c, d, e, and f of claims 1, 102, 122, and 148). In Figure 3c, the parameter that is being evaluated is the darkness of the rings (as recited in claim 10). In addition, the number of oligonucleotides in each cluster is evaluated (as recited in claims 11-12, 39-40), and the cluster is a subset of the oligonucleotides (as recited in claims 106-107, 119-121, 126-128, 139-141). The nucleotides are attached to the microarray (as recited in claims

16, 130), and the nucleotides are clustered along a region of the microarray (as recited in claim 37).

As is stated in the caption to Figure 3 on page 1371 of Southern et al. (1994):

> Figure 3. Hybridisation of an oligopyrimidine and a RNA to scanning arrays. a. Hybridisation of a sequence of pyrimidines,... to an arrays of complementary oligopurines based on the sequence,... b. Hybridisation of a 528-base transcript of exon 10 of the CFTR gene to an array representing bases 287-305,... In both experiments, the reaction cell was 30 nm diameter and. the offset 3 mm, giving rise to decanucleotides along the center line. c. The hybridization pattern shown in 3b has unexpected features. Coupling started on the right of the plate, so the bases in the crescent shape at position 2 are the dinucleotide GG; adding a T in the third position abolishes the 'hybridisation' of the target. Further along the plate, it can be seen that a shift of one position along the sequence can cause a fall from strong to negligible interaction, and in one position, the 7-, 8- and 9-mers all interact more strongly that the 10-mer.

Consequently, the caption and its illustration indicates qualitative ranking between cluster based on both cluster size and lengths of oligonucleotides within the clusters. Subsets of the clusters are selected with the numbered arrows above the picture. The oligonucleotides can be DNA or RNA and they are parts of microarrays as indicated in the title of Southern et al. (1994) and the first column of page 1373 of Southern et al. (1994). (as recited in instant claims 17-21, 111-112, 131-132, and 154-156).

However, Southern et al. (1994) does not teach the step of predicting the hybridization of the oligonucleotide by the presence of said hybridization cluster. In addition, Southern (1994) does not teach sequential overlapping oligomers of equal length. (as recited in part of step a of independent claims 1, 102, 122, and 148).

Southern (1996), entitled, "High density gridding: techniques and applications," states in the section, "Dedicated oligonucleotide arrays for mutation analysis" on page 87, column 2, lines 4-7, "It is envisaged that dedicated arrays will be useful for mutation detection. Comparison of the hybridization patterns of wild-type and mutant sequences

to an array of oligonucleotides complementary to the wild type will reveal a difference." (as recited in part of step e of instant claims 1, 102, 122, and 148).

The abstract of Southern (1996) states:

> Much progress has been made in the development of techniques for constructing dense grids either of ligands, such as peptides and oligonucleotides, or of cloned nucleic acids. Such arrays are finding practical applications in the analysis of sequence variation and gene expression. Methods for carrying out large numbers of analyses in parallel will be essential for the genetic programme that is developing from large-scale sequencing projects.

Southern (1994) does not teach sequential overlapping oligomers of equal length.

The article of Drmanac et al, entitled, "Sequencing of megabase plus DNA by hybridization: theory of the method," states in the abstract that a similar type of staggered DNA analysis is employed as in the Southern references (i.e. see Figure 1), but now the method is theoretical rather than experimental and computer power is necessary. As stated in lines 1-4 and 30-35 of the abstract:

> A mismatch-free hybridization of oligonucleotides containing from 11 to 20 monomers to unknown DNA represents, in essence, a sequencing of a complementary target...
> The sequence can be derived from simple primary data only by extensive computing. Phased experimental tests and computer simulation increasing in complexity are needed before accurate estimates can be made...

Figure 1 of Drmanac on page 115 illustrates the target sequence (Figure 1A) and the sequential overlapping 8-mers (Figure 1B) which hybridize to the target and assist in sequencing it. (as recited in part of step c of independent claims 1, 102, 122, and 148, instantly rejected claims 15, 103-104, 108-109, 124, 129, 142, 144, 149-151, and 153).

It would have been obvious to someone of ordinary skill in the art at the time of the instant invention to modify the complementary arrays of Southern et al. (1994) with the mutation detection method of Southern (1996) with the empirical and computational

method of detecting hybridization of Drmanac et al., because while all methods use the same method of staggered hybridization and the Southern (1996) cites the Southern et al. (1994) as its method of use, Southern (1996) has the advantage of employing the techniques of Southern et al. (1994) for mutation analysis and Drmanac et al. has the advantage of examining hybridization both empirically and computationally for more accurate sequence detection.

35 U.S.C. 103 Rejection #2:

Claims 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Southern et al. (1994) in view of Southern (1996) in view of Drmanac et al. as applied to claims 1-2, 10-12, 15-22, 37, 39, 40, 102-104, 106-112, 119-124, 126-132, 139-151, 153-156 above, and further in view of Southern et al. [Genomics, 1992, volume 13, pages 1008-1017].

Claim 13 claims statistically sampling a cluster of oligonucleotides.

Southern et al. (1994) in view of Southern (1996) in view of Drmanac et al. as applied to claims 1-2, 10-12, 15-22, 37, 39, 40, 102-104, 106-112, 119-124, 126-132, 139-151, 153-156 above do not teach the method of statistical sampling with dimensionless numbers as required by the instant claims.

The article of Southern et al. (1992), entitled, "Analyzing and comparing nucleic acid sequences by hybridization to arrays of oligonucleotides: evaluation using experimental models," illustrates on page 1013 in Tables I and II ranks of clusters

illustrated in Figure 5 on page 1013 of Southern et al. (1992) ranks and dimensionless scores of sequences within each cluster.

It would have been obvious at the time of the instant invention to modify Southern et al. (1994) in view of Southern (1996) in view of Drmanac et al. as applied to claims 1-2, 10-12, 15-22, 37, 39, 40, 102-104, 106-112, 119-124, 126-132, 139-151, 153-156 above, in further view of Southern et al. (1992) to result in the instant invention because Southern (1992) has the advantage of quantitative ranking for more efficient genomic analysis.

35 U.S.C. 103 Rejection #3:

Claims 5-7, 23-24, 30-36, 38, 105, 113-118, 125, 133-138, 152, 157-165 are rejected under 35 U.S.C. 103(a) as being unpatentable over Southern et al. (1994) in view of Southern (1996) in view of Drmanac et al. as applied to claims 1-2, 10-12, 15-22, 37, 39, 40, 102-104, 106-112, 119-124, 126-132, 139-151, 153-156 above, and further in view of Petersheim et al. [Biochemistry, 1983, volume 22, pages 256-263].

Claims 5-7, 23-24, 30-36, 105, 114-118, 125, 134-138, 152, 157, 162, and 164-165 include specific thermodynamic parameters for calculations.

Claims 157 and 163 include specific computational requirements.

Claims 38, 113, and 133 claim include thermodynamic cut-off values.

Southern et al. (1994) in view of Southern (1996) in view of Drmanac et al. as applied to claims 1-2, 10-12, 15-22, 37, 39, 40, 102-104, 106-112, 119-124, 126-132,

139-151, 153-156 above do not teach the thermodynamic parameters and cut-off values present in the instant claims.

The article of Petersheim et al, entitled, "Base-stacking and base-pairing contributions to helix stability: thermodynamics of double-helix formation with CCGG, CCGGp, CCGGAp, ACCGGp, CCGGUp, and ACCGGUp," states in the first sentence of the introduction, "Due to development of rapid sequencing techniques, there has been an explosion in our knowledge of nucleic acid sequences. This understanding provides a foundation for understanding the functions and mechanisms of these macromolecules." (as recited in instant claim 157)

Equations 1 through 5 on page 257 of Petersheim et al. provide the guidelines behind the thermodynamic parameters (free energy, melting temperature, entropy, and enthalpy) of duplex formation shown in Figures 2-6 on page 258-259 of Petersheim et al. Figure 2 et al. of Petersheim et al. even displays in a sigmoidal curve the cutoff parameters for melting point (i.e. the ranges at which no conformational transitions occur). (as recited in instant claims 5-7, 23-24, 30-36, 105, 114-118, 125, 134-138, 152, 162, 164-165)

It would have been obvious at the time of the instant invention to modify Southern et al. (1994) in view of Southern (1996) in view of Drmanac et al. as applied to claims 1-2, 10-12, 15-22, 37, 39, 40, 102-104, 106-112, 119-124, 126-132, 139-151, 153-156 above, in further view of Petersheim et al. to result in the instant invention because Petersheim et al. has the advantage of using thermodynamics to analyze structure and function of the same types of duplexes employed in the microarrays of

Southern et al. It would have been further obvious to employ the ranges shown in the claims (as recited in claims 31-35), as the hybridization process is analogous for oligonucleotides of any given length and location.

35 U.S.C. 103 Rejection #4:

Claims 8-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over over Southern et al. (1994) in view of Southern (1996) in view of Drmanac et al. as applied to claims 1-2, 10-12, 15-22, 37, 39, 40, 102-104, 106-112, 119-124, 126-132, 139-151, 153-156 above, and further in view of McMahon et al. [US Patent 5,310,650].

Claims 8 and 9 claim kinetic properties and coupling efficiencies of the hybridizations.

Southern et al. (1994) in view of Southern (1996) in view of Drmanac et al. as applied to claims 1-2, 10-12, 15-22, 37, 39, 40, 102-104, 106-112, 119-124, 126-132, 139-151, 153-156 above do not teach the kinetic properties and coupling efficiencies of the reactions.

The invention of McMahon et al, entitled, "Method and device for improved reaction kinetics in nucleic acid hybridizations," teaches kinetics and coupling efficiencies of hybridizations in column 13 (Table 1) for improved binding assays.

It would have been obvious at the time of the instant invention to modify Southern et al. (1994) in view of Southern (1996) in view of Drmanac et al. as applied to claims 1-2, 10-12, 15-22, 37, 39, 40, 102-104, 106-112, 119-124, 126-132, 139-151, 153-156 above in further view of McMahon et al. because McMahon et al. applies to

hybridizations methods the use and study of both kinetics and hybridization efficiencies from a more efficient and improved assay.

Claim Objections

Claims 14, 25, and 27-28 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Response to Arguments

Applicant's arguments filed 22 January 2007 have been fully considered and they are persuasive. New grounds of rejection have been applied.

Applicants had several arguments regarding the previous Office action about the obviousness rejection involving Southern et al. (1994) in view of Southern (1996).

First, applicant argues on page 21 of the Remarks of 22 January 2007 that the set of instant claims refer to a set of oligonucleotides of identical length whereas the Southern references teach oligonucleotides with non-identical length,

Second, applicant argues on page 21 of the Remarks of 22 January 2007 that only a subset of the complete set of oligonucleotides is examined whereas Figure 1 of Southern et al. (1994) investigate a complete set.

Third, applicant argues on page 21 of the Remarks of 22 January 2007 that the crescents in Figure 3 of Southern et al. (1994) do not result in a selection. In addition, each crescent refers to an oligonucleotide of a different length.

In response to the arguments of 21 January 2007, the article of Drmanac et al. is combined with the two Southern references to form an obviousness prior art rejection. Drmanac et al. illustrates in Figure 1B a subset of the target oligonucleotide of Figure 1A comprised of overlapping oligonucleotides of identical length.

In response to the third argument of applicants, in the absence of a definition of "selection" in the specification, the colors and arrows in Figure 3c is a form of denoting (or "selecting") oligonucleotides with the highest hybridization intensities.

Conclusion

No claim is allowed.

Papers related to this application may be submitted to Technical Center 1600 by facsimile transmission. Papers should be faxed to Technical Center 1600 via the central PTO Fax Center. The faxing of such pages must conform with the notices published in the Official Gazette, 1096 OG 30 (November 15, 1988), 1156 OG 61 (November 16, 1993), and 1157 OG 94 (December 28, 1993)(See 37 CFR § 1.6(d)). The Central PTO Fax Center Number is (571) 273-8300.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Russell Negin, Ph.D., whose telephone number is (571) 272-1083. The examiner can normally be reached on Monday-Friday from 7am to 4pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's Supervisor, Ram Shukla, Supervisory Patent Examiner, can be reached at (571) 272-0735.

Information regarding the status of the application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information on the PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

RSN
20 April 2007

4/20/07

SHUBO (JOE) ZHOU, PH.D.
PATENT EXAMINER